What is claimed is:

1. A method of using a variable density fluid in a subterranean formation comprising introducing a fluid having a density that varies as a function of the pressure into the subterranean formation, wherein the fluid comprises a base fluid and a portion of elastic particles.

2. The method of claim 1 wherein the variable density fluid is used as a well fluid.

3. The method of claim 2 wherein the well fluid is selected from the group consisting of drilling fluids, completion fluids, and stimulation fluids.

4. The method of claim 2 wherein the well fluid is selected from the group consisting of drilling muds, well cleanup fluids, workover fluids, spacer fluids, gravel pack fluids, acidizing fluids, and fracturing fluids.

5. The method of claim 1 further comprising the step of drilling, completing and/or stimulating a subterranean formation using the variable density fluid.

6. The method of claim 1 further comprising the step of producing a fluid from the subterranean formation.

7. The method of claim 6 wherein the fluid comprises oil, gas or a mixture thereof.

8. The method of claim 1 further comprising the step of drilling a borehole in the subterranean formation, wherein the borehole has a diameter that differs no more than about 25% along the length of the borehole.

9. The method of claim 8 wherein the borehole has a diameter that differs no more than about 1% to about 5% at any two points along the length of the borehole.

10. The method of claim 8 wherein the borehole comprises strings of casing the substantial majority of which strings are made from the same piping schedule.

11. The method of claim 1 further comprising the step of drilling a borehole in the subterranean formation, wherein the method does not comprise a step of circulating a different fluid at any point during the drilling of the bore hole.

12. The method of claim 1 wherein the portion of elastic particles comprises elastic particles comprising a copolymer of styrene and divinylbenzene; a copolymer of styrene and acrylonitrile; or a terpolymer of styrene, vinylidene chloride and acrylonitrile.

13. The method of claim 1 wherein the elastic particles have an isothermal compressibility factor in the range of from about $1.5x10^{-3}$ (1/psi) to about $1.5x10^{-9}$ (1/psi).

14. The method of claim 1 wherein the base fluid comprises water, a non-aqueous fluid, or a mixture thereof.

15. The method of claim 14 wherein the non-aqueous fluid comprises an organic fluid.

16. The method of claim 15 wherein the organic fluid is capable of emulsifying a water solution of salts.

17. The method of claim 15 wherein the organic fluid comprises mineral oils, synthetic oils, esters, or a mixture thereof.

18. The method of claim 1 wherein the base fluid is present in the variable density fluid in an amount sufficient to form a pumpable fluid.

19. The method of claim 1 wherein the base fluid is present in the variable density fluid in an amount in the range of from about 20% to about 99.99% by volume.

20. The method of claim 1 wherein the portion of elastic particles is present in the variable density fluid in an amount in the range of from about 0.01% to about 80% by volume of the variable density fluid.

21. The method of claim 1 wherein the elastic particles further comprise an internal fluid.

22. The method of claim 21 wherein the internal fluid comprises air, nitrogen, carbon dioxide, propane, isobutane, normal butane, normal or branched pentane, ammonia, fluorinated hydrocarbons, hydrochlorofluorocarbons, argon, helium, or a mixture thereof.

23. The method of claim 1 wherein the elastic particles have a specific gravity in the range of from about 0.05 to about 0.99.

24. The method of claim 21 further comprising the step of expanding a portion of the elastic particles before placing them into the variable density fluid.

25. The method of claim 24 wherein the step of expanding a portion of the elastic particles comprises expanding the portion of elastic particles up to about 40 times their original volume.

26. The method of claim 1 wherein a portion of the elastic particles can withstand pressures up to about 21,000 psi without crushing.

27. The method of claim 1 wherein a portion of the elastic particles can rebound to about their original size and shape when pressure is removed.

28. The method of claim 1 wherein a portion of the elastic particles can withstand temperatures up to about 500°F without degrading.

29. The method of claim 1 wherein the elastic particles are substantially impermeable to a fluid present in the subterranean formation.

30. The method of claim 29 wherein the surface of a portion of the elastic particles is coated with a substantially impermeable material to render the elastic particles substantially impermeable to a fluid present in the subterranean formation.

31. The method of claim 30 wherein the material is hydrophilic or hydrophobic.

32. The method of claim 31 wherein the hydrophobic material comprises silanes, silicone polymers, latexes, or a mixture thereof.

33. The method of claim 31 wherein the hydrophilic material comprises ethylene oxide, propylene oxide, acrylic acid, 2-acrylamido-2-methylpropane sulfonic acid, aminoalkoxysilanes, or a mixture thereof.

34. The method of claim 1 wherein the subterranean formation is located beneath the ocean floor, or on-shore.

35. The method of claim 1 wherein the variable density fluid has a density at sea level in the range of from about 4 lb/gallon to about 18 lb/gallon.

36. The method of claim 34 wherein the subterranean formation comprises a borehole, and wherein the density of the variable density fluid increases as the pressure in the borehole increases.

37. The method of claim 36 wherein the density of the drilling fluid in the borehole is in the range of from about 0.01% to about 300% higher than its density at sea level.

38. The method of claim 36 wherein the density of the variable density fluid in the borehole is sufficient to prevent fluid influx from a region of the subterranean formation adjacent to the borehole without fracturing a region of the formation.

39. The method of claim 36 wherein the subterranean formation is located beneath the ocean floor, and wherein the density of the variable density fluid decreases as the variable density fluid travels from the ocean floor to sea level.

40. The method of claim 1 wherein the variable density fluid further comprises a salt, a fluid loss additive, a shale swelling inhibitor, an emulsifier, a viscosifier, a pH control agent, a filtration control agent, or a fixed-density weighting agent.

41. The method of claim 1 wherein the variable density fluid is prepared by adding a portion of elastic particles to a fluid above sea level, at sea level, below sea level, or a combination thereof.

42. The method of claim 41 further comprising the step of drilling a borehole into the ocean floor, wherein a riser extends from the borehole to about sea level, and wherein a portion of the elastic particles are added to the fluid below sea level by injecting them into a riser.

43. The method of claim 41 wherein the addition of the portion of elastic particles to the fluid reduces the density of the fluid.

44. A method of drilling, completing and/or stimulating a subterranean formation using a variable density fluid comprising the steps of:

introducing a fluid having a density that varies as a function of pressure into the subterranean formation, wherein

the fluid comprises a base fluid and a portion of elastic particles;

the elastic particles have an isothermal compressibility factor in the range of from about $1.5x10^{-3}$ (1/psi) to about $1.5x10^{-9}$ (1/psi); and

drilling, completing and/or stimulating a subterranean formation using the variable density fluid.

45. The method of claim 44 wherein the elastic particles comprise a copolymer of styrene and divinylbenzene; a copolymer of styrene and acrylonitrile; or a terpolymer of styrene, vinylidene chloride and acrylonitrile.

46. The method of claim 44 wherein the elastic particles have a specific gravity in the range of from about 0.05 to about 0.99.

47. A method of avoiding the loss of circulation of a well fluid in a subterranean formation, comprising the step of adding to the well fluid a portion of elastic particles, the elastic particles being capable of varying in volume with pressure.

48. The method of claim 47 wherein the well fluid is selected from the group consisting of drilling fluids, completion fluids, and stimulation fluids.

49. The method of claim 47 wherein the well fluid is selected from the group consisting of drilling muds, well cleanup fluids, workover fluids, spacer fluids, gravel pack fluids, acidizing fluids, and fracturing fluids.

50. The method of claim 47 further comprising the step of drilling, completing and/or stimulating a subterranean formation using the variable density fluid.

51. The method of claim 47 wherein the portion of elastic particles is present in the well fluid in an amount in the range of from about 0.01% to about 80% by volume of the well fluid.

52. The method of claim 47 wherein the elastic particles have a specific gravity in the range of from about 0.05 to about 0.99; and wherein the elastic particles have a compressibility factor in the range of from about $1.5x10^{-3}$ (1/psi) to about $1.5x10^{-9}$ (1/psi).

53. The method of claim 47 wherein the portion of elastic particles comprises elastic particles comprising a copolymer of styrene and divinylbenzene; a copolymer of styrene and acrylonitrile; or a terpolymer of styrene, vinylidene chloride and acrylonitrile.

54. The method of claim 47 wherein the well fluid is placed in a borehole within the subterranean formation, and wherein the density of the well fluid is sufficient to prevent fluid influx from a region of the subterranean formation adjacent to the borehole without fracturing a region of the formation.

55. The method of claim 47 further comprising the steps of:

placing the well fluid in a borehole in the subterranean formation;

permitting a portion of the well fluid to enter openings in a region of the subterranean formation in fluid communication with the borehole; and

permitting the well fluid to seal the openings off from the borehole.

56. The method of claim 55 wherein the step of permitting the well fluid to seal the openings off from the borehole comprises permitting the elastic particles within the portion of

the well fluid to expand upon entering the fractures such that the openings are sealed off from the borehole.

57. The method of claim 55 wherein the portion of elastic particles is present in the well fluid in an amount in the range of from about 0.01% to about 80% by volume of the well fluid.

58. The method of claim 55 wherein the elastic particles have a specific gravity in the range of from about 0.05 to about 0.99; and wherein the elastic particles have a compressibility factor in the range of from about $1.5x10^{-3}$ (1/psi) to about $1.5x10^{-9}$ (1/psi).

59. The method of claim 55 wherein the portion of elastic particles comprise elastic particles comprising a copolymer of styrene and divinylbenzene; a copolymer of styrene and acrylonitrile; or a terpolymer of styrene, vinylidene chloride and acrylonitrile.

60. A fluid having a density that varies as a function of pressure comprising:

a base fluid; and

a portion of elastic particles, the elastic particles having an isothermal compressibility factor in the range of from about $1.5x10^{-3}$ (1/psi) to about $1.5x10^{-9}$ (1/psi).

61. The fluid of claim 60 wherein the fluid is selected from the group consisting of drilling fluids, completion fluids, and stimulation fluids.

62. The fluid of claim 60 wherein the fluid is selected from the group consisting of drilling muds, well cleanup fluids, workover fluids, spacer fluids, gravel pack fluids, acidizing fluids, and fracturing fluids.

63. The fluid of claim 60 wherein the base fluid comprises water, a non-aqueous fluid, or a mixture thereof.

64. The fluid of claim 63 wherein the non-aqueous fluid comprises an organic fluid.

65. The fluid of claim 64 wherein the organic fluid is capable of emulsifying a water solution of salts.

66. The fluid of claim 64 wherein the organic fluid comprises mineral oils, synthetic oils, esters, or a mixture thereof.

67. The fluid of claim 60 wherein the base fluid is present in the fluid in an amount sufficient to form a pumpable well fluid.

68. The fluid of claim 60 wherein the base fluid is present in the fluid in an amount in the range of from about 20% to about 99.99% by volume.

69. The fluid of claim 60 wherein the elastic particles have a specific gravity in the range of from about 0.05 to about 0.99.

70. The fluid of claim 60 wherein the portion of elastic particles comprise elastic particles comprising a copolymer of styrene and divinylbenzene; a copolymer of styrene and acrylonitrile; or a terpolymer of styrene, vinylidene chloride and acrylonitrile.

71. The fluid of claim 60 wherein a portion of the elastic particles further comprise an internal fluid.

72. The fluid of claim 71 wherein the internal fluid comprises air, nitrogen, carbon dioxide, propane, isobutane, normal butane, normal or branched pentane, ammonia, fluorinated hydrocarbons, hydrochlorofluorocarbons, argon, helium, or a mixture thereof.

73. The fluid of claim 60 wherein the portion of elastic particles is present in the fluid in an amount in the range of from about 0.01% to about 80% by volume of the fluid.

74. The fluid of claim 71 wherein a portion of the elastic particles have been expanded to up to about 40 times their original volume.

75. The fluid of claim 60 having a density at sea level in the range of from about 4 lb/gallon to about 18 lb/gallon.

76. The fluid of claim 60 wherein a portion of the elastic particles can withstand a pressure up to about 21,000 psi without crushing.

77. The fluid of claim 60 wherein a portion of the elastic particles can rebound to about their original size and shape when pressure is removed.

78. The fluid of claim 60 wherein a portion of the elastic particles can withstand temperatures up to about 500°F without degrading.

79. The fluid of claim 60 wherein a portion of the elastic particles are substantially impermeable to a fluid present in a subterranean borehole.

80. The fluid of claim 79 wherein the surface of a portion of the elastic particles is coated with a substantially impermeable material to render the elastic particles substantially impermeable to a fluid present in a subterranean borehole.

81. The fluid of claim 80 wherein the material is hydrophilic or hydrophobic.

82. The fluid of claim 81 wherein the hydrophobic material comprises silanes, silicone polymers, latexes, or a mixture thereof.

83. The fluid of claim 81 wherein the hydrophilic material comprises ethylene oxide, propylene oxide, acrylic acid, 2-acrylamido-2-methylpropane sulfonic acid, aminoalkoxysilanes, or a mixture thereof.

84. The fluid of claim 60 having a density that increases as the pressure in a subterranean borehole increases.

85. The fluid of claim 84 wherein the density of the fluid in the borehole is in the range of from about 0.01% to about 300% higher than its density at sea level.

86. The fluid of claim 84 wherein the subterranean borehole is located beneath the ocean floor, and wherein the density of the fluid decreases as the fluid travels from the subterranean borehole up to sea level.

87. The fluid of claim 60 further comprising a salt, a fluid loss additive, a shale swelling inhibitor, an emulsifier, a viscosifier, a filtration control agent, a pH control agent, a fixed-density weighting agent, or a mixture thereof.